IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

REISSUE APPLICATION
of U. S. Patent No. 5,980,620

Issued: November 9, 1999

Examiner: Anthony Green

Group Art Unit: 1755

Title: INHIBITION OF BACTERIAL GROWTH

AMENDMENT PRESENTING NEW CLAIMS

Commissioner for Patents and Trademarks
Washington, DC 20231

Sir:

Please enter the following claims in the above reissue application:

--1. A substantially dry and substantially homogeneous anti-microbial powder coating composition comprising particles each of which is a thermosetting polymer powder and contains an organic biocide in a concentration of from 0.1 to 20% by weight, whereby the biocide is substantially uniformly distributed throughout the composition.

2. A powder coating composition according to Claim 1, wherein the biocide is present in an amount from 2 to 6% by weight.

3. A powder coating composition according to Claim 1 or 2, wherein the biocide is a trichlorohydroxydiphenylether.

4. A powder coating composition according to Claim 3, wherein the biocide 2,4,4'-trichloro-2'-hydroxydiphenylether.

5. A powder coating composition according to Claim 1 or 2, wherein the biocide is a methylurea.

6. A powder coating composition according to Claim 5, wherein the biocide is 3-(3,4-dichlorophenyl)-1, 1-dimethylurea.

7. A powder coating composition according to Claim 1 or 2, wherein the biocide is an imidazolcarbamate.

8. A powder coating composition according to Claim 1, wherein the polymer powder has a specific gravity of from 1.2 to 1.9 and a particle size less than 100 microns.

9. A powder coating composition according to Claim 1, wherein the polymer particles comprise a polyester or epoxypolyester or polyurethane or acrylic or other thermosetting powder.

10. An anti-microbial powder coating composition comprising an anti-microbial agent homogeneously dispersed within the particles of a resin based powder.

11. The composition of Claim 10, wherein the powder coating composition comprises 90 to 99.9% by weight of one or more thermosetting and/or thermoplastic compositions based on epoxy, polyester, acrylate, and/or polyurethane resins and 0.1 to 10% by weight of one or more anti-microbial agents.

12. The composition of Claim 10, wherein said anti-microbial agent further comprises solid anti-microbial agents.

13. A method of applying an anti-microbial coating on an article, said method comprising contacting said article with an anti-microbial powder coating composition under conditions sufficient to cause said anti-microbial powder coating composition to adhere to said article, the composition comprising particles each of which is a thermosetting polymer powder and contains an organic biocide, in a concentration of from 0.1 to 20% by weight, whereby the biocide is substantially uniformly distributed throughout the coating.

14. A method of applying an anti-microbial coating on an article, said method comprising contacting said article with an anti-microbial powder coating composition under conditions sufficient to cause said anti-microbial powder coating composition to adhere to said article, the composition comprising particles of a thermoplastic polymer containing an organic biocide, wherein the organic biocide is substantially uniformly distributed throughout the composition at a concentration of 0.1 to 20% by weight of the coating.

15. A method of applying an anti-microbial coating on an article, said method comprising contacting said article with an anti-microbial powder coating composition under conditions sufficient to cause said anti-microbial powder coating composition to adhere to said article, the composition comprising an anti-microbial agent homogeneously dispersed with in the particles of a resin based powder.

16. A method for preparing an anti-microbial powder coating composition comprising homogeneously mixing an anti-microbial agent into a powder coating pre-mix.

17. A method of distributing an organic biocide substantially uniformly in a thermosetting powder coating composition, the method comprising:

a mixing precursors of the thermosetting polymer powder together with the organic biocide in a concentration of 0.1 to 20% by weight and heating the mixture to form a hot mixture;

extruding the hot mixture into sheet form;

grinding the granules to a powder having the size of particles appropriate to powder coating; and

sieving the powder to less than 100 microns whereby the powder may be spray electrostatically.

18. A method of forming a coating on a metal substrate wherein said coating exhibits anti-microbial activity, the method comprising:

a mixing precursors of a thermosetting polymer powder together with particles of an organic biocide to form a mixture and then heating the mixture.

extruding the mixture into sheet form;

granulating the sheet to form granules;

grinding the granules to form a powder;

sieving the powder to the size of particles appropriate to electrostatic spraying;

electrostatically spraying the sieved powder on to the metal substrate to form said coating and;

curing the coating to provide said anti-microbial coating on the metal substrate.

19. A powder coating composition of claim 1, wherein the biocide comprises a liquid biocide.

20. The composition of claim 10, wherein the anti-microbial agent comprises a liquid anti-microbial agent.

21. The composition of claim 10, wherein the anti-microbial agent further comprises N-(trichloromethyl)-thiopthalamide.

22. The composition of claim 10, wherein the anti-microbial agent further includes 2-bromo-2-nitropropane-1,3-diol.

23. The composition of claim 22, wherein the 2-bromo-2-nitropropane-1,3-diol concentration is greater than 1 weight percent.

24. The composition of claim 23, wherein the 2-bromo-2-nitropropane-1,3-diol concentration is about 5 weight percent.

25. The composition of claim 10, wherein the anti-microbial agent further comprises 3,5-dimethyltetrahydro-1,3,5-2H-thiazine-2-thione.

26. The composition of claim 25, wherein the 2,5-dimethyltetrahydro-1,3,5-2H-thiazine-2-thione concentration is greater than 1 weight percent.

27. The composition of claim 26, wherein the 2,5-dimethyltetrahydro-1,3,5-2H-thiazine-2-thione concentration is about 5 weight percent.

28. A method of applying a coating on an article to provide an anti-microbial coating thereon, the method comprising:

electrostatically spraying a coating composition on to said article; and

baking said electrostatically sprayed coating composition on to said article at a temperature of 140°C to 210°C;

wherein the coating composition comprises particles of a thermoplastic polymer containing a biocide, and said biocide is substantially uniformly distributed throughout the coating composition at a concentration of 0.1 to 20% by weight of the coating composition.

29. The method of claim 16, further comprising blending the components of the powder coating composition using a pre-mixer, feeding the mixture into an extruder, and heating the mixture to a temperature high enough to melt it, cooling the melt, and processing the solid extrudate into a coating powder.

30. The method of claim 16, further comprising mixing liquid anti-microbial agents with particles of a solid support material and mixing the particles into the coating pre-mix.

31. The method of claim 30, further comprising treating the powder coating

particles by impacting them with particles containing an anti-microbial agent to adhere the anti-microbial agent to the coating powder particles.

32. The method of claim 16, further comprising dissolving, dispersing or mixing the anti-microbial agent and the other components of the powder coating formulation into a liquid solvent, followed by removing the solvent in such a way as to yield a solid product which can be processed into a powder coating.--

REMARKS

Newly presented claims 1-32 are presented by this amendment. Composition claim 10 and method claim 16 have been copied from U.S. Patent No. 6,093,407. Applicants request an interference be declared between their'620 patent and the '407 patent.

The additional claims are presented because Applicants verily believe, that, without any deceptive intent, they failed to claim all that they had a right to claim and that thus, the '620 patent is wholly or partly invalid due to their failure to claim.

Applicants recently discovered they had claimed less than they had a right to claim upon reviewing U.S. Patent No. 6,093,407 issued to DuPont, as well as reviewing their U.S. Patent No. 6,129,782, which is owned by the same Assignee as the '620 patent.

It is submitted that the newly presented claims and the original claims are patentable to the present inventors.

Respectfully submitted,

June 13, 2001

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